astronomy

INFRARED

Cosmic blackbody

Attempts to extend observation of the three-degree universal blackbody radiation (SN: 6/15, p. 575) into the infrared range generally depend on indirect observations. The technique is to look at characteristic radiation of interstellar gas clouds that have been presumably heated by the blackbody and calculate the temperature to which they have been heated.

Observations of clouds of the molecules CN, CH and ionized CH at wavelengths of 1.32, 0.559 and 0.359 millimeters set upper limits on the temperature. The limits that range between 2.82 and 8.11 degrees K., say Drs. V. J. Bartolot Jr. and J. F. Clauser of Columbia University and Patrick Thaddeus of the Goddard Institute for Space Studies in PHYSICAL REVIEW LETTERS for Feb. 17.

Although some of these observed limits are higher than three degrees, the authors argue that they are all compatible with an actual three-degree blackbody.

What appears not compatible with the blackbody is a hot infrared flux—too hot for a three-degree blackbody—that was observed by a recent rocket flight and interpreted as being possibly universal. All the temperature limits set by the present experiment are a good deal cooler than that hot flux, so the three authors conclude that the hot flux cannot be affecting the gas clouds they studied. Unless the hot flux is concentrated in wavelengths that avoid the resonant wavelengths of these gases and therefore do not heat them, this means that its source must be fairly near the earth. In that case it would have no relation to the blackbody dispute.

OBSERVATION

New flying telescope

A 36-inch aperture infrared telescope will be built by Owens-Illinois Company and installed in the National Aeronautics and Space Administration's high altitude observatory aircraft. It will be flown at altitudes high enough to be above most of the atmospheric absorption that prevents infrared from reaching the earth's surface.

The new telescope will be used for detailed studies of the planets and their moons, comets, asteroids, the solar surface and stellar and galactic phenomena that radiate in the infrared.

The cost will be about $3 million, and construction is expected to take about 30 months.

NEUTRINOS

Why there are none from the sun

Measurements made late last year indicated that the sun apparently does not give off neutrinos. From this some observers have concluded that far less of the sun's energy than was previously thought comes from neutrino producing processes.

However, Dr. W. R. Sheldon of the University of Houston suggests that the reason no neutrinos were seen in the cited observation was that the sun wasn't giving off any just at that time, but might well emit them at other times.

He points out in the FEB. 15 NATURE that theoretical calculations of the expected neutrino flux from the sun are all based on a steady rate of nuclear burning.

But if the sun's thermonuclear reaction rate fluctuates, Dr. Sheldon says, the neutrino flux might be zero at a certain moment, but nevertheless yield the average expected flux over a long period.

Since a number of solar phenomena have an 11-year cycle, Dr. Sheldon suggests that this may also be the case for the thermonuclear energy production. If this should be so, he adds, and if there should be a quadrupole magnetic field in the sun, the combination of the two could explain the 11-year sunspot cycle.

RADIO

Crab nebula pulsars

The position of the second Crab nebula pulsar, NP-0527, has been measured with the 300-foot transit telescope of the National Radio Astronomy Observatory at Green Bank, W.Va., in order to determine it more accurately than previous observations did.

Drs. Edward C. Reifenstein, III, William D. Brundage and David H. Staelin report in the Feb. 17 PHYSICAL REVIEW LETTERS that the accurate position is right ascension five hours, 26 minutes, 10 seconds plus or minus 40 seconds and declination 22 degrees, zero minutes plus or minus 30 minutes. This puts NP-0527 1.2 degrees away from the pulsar NP-0532, which lies within the nebula.

The authors suggest that the proximity indicates that both these pulsars had their origin in the supernova explosion of 1054 A. D., which left the nebula behind—a theory which has been put forward earlier (SN: 12/14, p. 592). Since NP-0527 is outside the nebula, the authors suggest that it was blown clear by the explosion and should still be moving. They estimate a speed of about 0.15 times the speed of light and suggest that observations over some time of NP-0527 against the stellar background may show the motion.

PLANETS

Venus radio flux

In theory, if a slowly rotating planet has a significant daily temperature variation at its surface, radio waves originating just below the surface should show a variation. This variation would depend on how much of the planet's illuminated side is visible from the earth at any time.

Past observations have shown such an effect for Venus at wavelengths between 0.8 and 10 centimeters, and it has been suggested that the effect applies to radiation down to 4 millimeters.

But a recent observation by Dr. David Morrison of Harvard College Observatory and the Smithsonian Astrophysical Observatory shows no such effect at a wavelength of 1.95 centimeters.

This gap brings into question, he says in SCIENCE for Feb. 21, the previous conclusion that the short wavelengths originate below the planet's surface.

Wavelengths greater than five centimeters may still come from below the surface, he says.